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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/966,038
Filing Date: September 28, 2001
Appellant(s): BELLERS, ERWIN B.

Robert J. Crawford
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed October 16, 2008 appealing from the Office action mailed July 17, 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

4,755,795	Page	7-1988
6,473,008	Kelly et al	10-2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, 4, 7-9, 11, 14-16 and 18 are rejected under 35 U.S.C. 102(b) as being anticipate by Page (US Patent No. 4,755,795).

In considering of claim 1, Page discloses all the claimed subject matter, note 1) the claimed an input receiving an analog video signal is met by the analog input signal (Fig. 1, col. 2, lines 41-53), 2) the claimed a sampling mechanism coupled to the input and sampling the analog video signal utilizing a variable sampling rate modulated for segments of the analog video signal based upon spatial frequencies within the image content contained within the analog video signal is met by the analog-to-digital converter 13, the bandwidth analyzer 22 which analyzes the frequency content of an input signal (Fig. 1, col. 1, lines 61-68 and col. 2, line 41 to col. 6, line 21), 3) the claimed an output of said sampling mechanism being coupled to a signal analysis unit to determine a highest spatial frequency within the image content is met by the bandwidth analyzer 22 which analyzes the frequency content of an input signal and the sampling rate was adjusted as a function of the highest frequency component of the

input signal (Fig. 1, col. 1, lines 61-68 and col. 2, line 41 to col. 3, line 52), and 4) the claimed said variable sampling rate being adjustable both upward and downward over a continuous range as a function of the highest spatial frequency within the image content the analyzer 23 and the controller 21 which selects the sampling rates for resampler 17 according to the input data stream bandwidth (Fig. 1, col. 1, lines 61-68 and col. 2, line 41 to col. 6, line 21).

In considering claim 2, the claimed wherein first sampling rate is employed for a first segment of the analog video signal containing content having a first highest spatial frequency and a second sampling rate greater than the first sampling rate employed segment of the analog video signal containing content having a second highest spatial frequency greater than the first highest spatial frequency is met by the analyzer 23 and the controller 21 which selects the sampling rates (high or low) for resampler 17 according to the input data stream bandwidth (Fig. 1, col. 1, lines 61-68 and col. 2, line 41 to col. 6, line 21).

In considering claim 4, Page discloses all the claimed subject matter, note 1) the claimed wherein the sampling mechanism further comprises: a single analog-to-digital converter receiving the analog video signal and sampling the analog video signal at a fixed rate is met by the analog-to-digital converter 13 (Fig. 1, col. 1, lines 61-68 and col. 2, line 41 to col. 6, line 21), 2) the claimed signal analysis unit analyzing samples from the converter to select sampling rate for and each segment of the analog video signal is met by the bandwidth analyzer 22 which analyzes the frequency content of an input signal and selects the sampling rate for resampler 17 (Fig. 1, col. 1, lines 61-68 and col.

2, line 41 to col. 6, line 21), and 3) the claimed a downsampling unit retaining samples from the converter for each segment of the analog video signal based upon corresponding sampling rate selected by the signal analysis unit is met by the resampler 17 (Fig. 1, col. 1, lines 61-68 and col. 2, line 41 to col. 6, line 21).

In considering claim 7, the claimed wherein the sampling mechanism samples the analog video signal at a first rate and transmits samples for at least one segment of the analog video signal at second rate different than the first rate is met by the ADC 13 and resampler 17 (Fig. 1, col. 2, line 41 to col. 3, line 52).

Claim 8 is rejected for the same reason as discussed in claim 1 and further the claimed an output transmitting a digital video signal to a display, a storage system, or another device is met by the memory 15 (Fig. 1, col. 2, lines 42-60).

Claim 9 is rejected for the same reason as discussed in claim 2 above.

Claim 11 is rejected for the same reason as discussed in claim 4 above.

Claim 14 is rejected for the same reason as discussed in claim 7 above.

In considering claim 15, Page discloses all the claimed subject matter, note 1) the claimed an input receiving an analog video signal is met by the analog input signal (Fig. 1, col. 2, lines 41-53), and 2) the claimed a sampling the analog video signal utilizing variable sampling rate modulated for segments of the analog video signal based upon spatial frequencies within the image content contained within the analog video signal is met by the analog-to-digital converter 13, the bandwidth analyzer 22 which analyzes the frequency content of an input signal (Fig. 1, col. 1, lines 61-68 and col. 2, line 41 to col. 6, line 21), 3) the claimed determining a highest spatial frequency

within the image content is met by the bandwidth analyzer 22 which analyzes the frequency content of an input signal and the sampling rate was adjusted as a function of the highest frequency component of the input signal (Fig. 1, col. 1, lines 61-68 and col. 2, line 41 to col. 3, line 52), and 4) the claimed adjusting the variable sampling rate both upward and downward over a continuous range as a function of a highest spatial frequency within the image content is met by the analyzer 23 and the controller 21 which selects the sampling rates for resampler 17 according to the input data stream bandwidth (Fig. 1, col. 1, lines 61-68 and col. 2, line 41 to col. 6, line 21).

Claim 16 is rejected for the same reason as discussed in claim 2 above.

Claim 18 is rejected for the same reason as discussed in claim 4 above.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 6, 13 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Page (US Patent No. 4,755,795) in view of Kelly et al (U.S. Patent No. 6,473,008 B2).

In considering claim 6, page disclose all the limitations of the instant invention as discussed in claims 1 and 2, except for providing the claimed wherein the rate for each segment of the analog video signal sampling is at least twice a highest spatial frequency within content contained by the corresponding segment of the analog video signal.

Kelly et al teaches that Nyquist theorem states that, in order to filter out the noise, the input signal is sampled with the sampling frequency greater than or equal to twice the highest frequency of the input signal (see col. 3, lines 17-48), the sampling can be applied to analog or digital input signal (see from col. 1, line 34 to col. 2, line 20), and that the sampling frequency can be fixed or varied (see from col. 1, line 34 to col. 2, line 20).

Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention to incorporate the selecting the rate for each segment of the analog video signal sampling is at least twice a highest spatial frequency within content as taught by Kelly et al into Page's system in order to increase the quality of the video signal because sampling the video signal using at least twice a highest spatial frequency will reduce noise or interference.

Claim 13 is rejected for the same reason as discussed in claim 6 above.

Claim 20 is rejected for the same reason as discussed in claim 6 above.

Allowable Subject Matter

5. Claims 3, 5, 10, 12, 17 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The dependent claims 3, 10 and 17 identifies the uniquely distinct features: "a plurality of analog-to-digital converters each coupled to one of the plurality of analog filters and having settings based upon the corresponding analog filter, each analog-to-digital converter sampling an output of the corresponding analog filter; and combination

logic selecting the output of one of the analog-to-digital converters for each segment of the analog video signal and combining the selected outputs". The closest prior art, Page (US Patent No. 4,755,795) and Kelly et al (U.S. Patent No. 6,473,008 B2), either singularly or in combination, fail to anticipate or render the above underlined limitations obvious.

The dependent claims 5, 12 and 19 identifies the uniquely distinct features: "wherein the sampling mechanism further comprises: a second analog-to-digital converter receiving the analog video signal and sampling the analog video signal at a variable rate; and a signal analysis unit analyzing samples from the first converter to select a sampling rate for each segment the analog video signal and adjusting the sampling rate of the second converter". The closest prior art, Page (US Patent No. 4,755,795) and Kelly et al (U.S. Patent No. 6,473,008 B2), either singularly or in combination, fail to anticipate or render the above underlined limitations obvious.

(10) Response to Argument

I. The rejection of claims 1-2, 4, 7-9, 11, 14-16, and 18 under 35 U.S.C. 102(b) over Page (U.S. Patent 4,755,795).

In re pages 5-6, appellant argues that the cited portions of the '795 reference involve digital signal sampling and related processing which is fundamentally different than the claimed analog signal sampling approach because the converter 13 fails to sample an analog signal at a variable sampling rate as suggested in the Final Office Action and the sampling rate adjustment occurs after the converter 13 and is carried out

upon a digital signal; that the '795 reference adjusts its sampling rate based upon spatial frequencies is also wrong because the cited portions of the ‘795 reference adjust a (digital signal) sampling rate at the resampler 17 using a comparison of “the overall power of the input signal to the power of a portion of the input signal in a certain bandwidth”; that the ‘795 reference’s sampling rate adjustment is thus not only carried on a digital signal, it further does not disclose modulating a variable sampling rate "based upon spatial frequencies within the image content" as claimed; and that the '795 reference make no mention whatsoever of video signal processing based upon spatial frequencies of image content or otherwise.

In response, the examiner respectfully disagrees. First at all, it is noted that claims recite "a sampling mechanism". The claimed “a sampling mechanism” is not limited to a single circuit or a single element or a single device but it can be a combination of several circuits, several devices, or several elements. The claimed "a sampling mechanism" is anticipated by the combination of ADC 13, the time delay 19, and the resampler 17 of Page. The combination of the ADC 13, the time delay 19, and the resampler 17 of Page samples the analog signal at a variable sampling rate as claimed.

Page discloses in col. 3, lines 25-39 that “The bandwidth analyzer 22 selects the sampling rates for resampler 17. Analyzer 22 compares the overall power of the input signal to the power of the portion of the input signal in a certain bandwidth. If the power of the chosen bandwidth portion is within a predetermined range of the overall power of the input signal, **the probability that the frequency components of the input signal**

are within the chosen bandwidth is high, and the sampling can be done at a rate appropriate for the chosen bandwidth without losing any significant information content. On the other hand, if the power of the chosen bandwidth portion is significantly less than the overall power, the input signal has a high bandwidth and a higher sampling rate should be selected to assure that the information content of the signal is captured". The claimed "spatial frequency" can be defined as "the frequency of change per unit distance across an image". The analyzing the probability that the frequency components of the input signal are within the chosen bandwidth of Page determines "the frequency of change per unit distance across an image". The claimed "spatial frequency" is anticipated by the bandwidth analyzer 22 of Page. Thus, the bandwidth analyzer 22 of Page adjusts the sampling rate based upon spatial frequencies as claimed.

Page also discloses in col. 5, lines 22-35 that "The schematic diagrams of a digital filter circuit that implements the filter function given in equation (5) is shown in FIG. 4. The input signals x(n) are applied to the positive input of adder 45. The input signals are also passed through an N sample delay 41 to provide an x(n-N) input which is multiplied by rN in multiplier 43. The output from multiplier 43, x(n-N)rN, is applied to a negative input of adder 45. The output of adder 45 is multiplied by 1/N in multiplier 51. The output of adder 45 is also passed through a feedback circuit comprised of multiplier 47, which multiplies the signal by r, and one sample delay 49, then applied to a negative input of adder 45, the factor r is a stability factor, chosen to guarantee the stability of the filter". From the above passage, it is clear that the modulating can be performed by the multiplier 43 or the multiplier 47 or the multiplier 51. Thus the claimed "modulating a

variable sampling rate based upon spatial frequencies within the image content" is anticipated by the multiplier 43 or the multiplier 47 or the multiplier 51 of Page.

As discussed above, the claimed video signal processing based upon spatial frequencies of image content is anticipated by the combination of ADC 13, the time delay 19 , and the resampler 17 of Page because they are based upon the bandwidth analyzer 22.

II. The rejection of claims 6, 13 and 20 stand rejected under 35 U.S.C. § 103(a) over Page (U.S. Patent 4,755,795).

In re pages 6-7, appellant traverses the Examiner's taking of Official Notice and the corresponding rejections because the Final Office Action goes on to assert that the capability "is old and well known in the art" without providing any citation or evidence whatsoever in support the Official Notice and the Final Office Action failed to provide any evidence of motivation for modifying the '795 reference, or to discuss such a modification in any manner because the modification would undermine the purpose of the '795 reference and the '795 reference's sampling of a digital signal based upon the bandwidth of the digital signal and corresponding Fourier transform (see, e.g., column 3:66-4:5) teaches away from the proposed modification because the modification would result in the sampling of an analog signal, rather than digital, upon which the indicated transform cannot operate.

In response, the examiner respectfully disagrees. The capability of selecting the rate for each segment of the analog video sampling is at least twice a highest spatial frequency within content contained by the corresponding segment of the analog video

signal is old and well known in the art and shown in the newly cited reference Kelly et al (U.S. Patent No. 6,473,008 B2). Kelly et al teaches that Nyquist theorem states that, in order to filter out the noise, the input signal is sampled with the sampling frequency greater than or equal to twice the highest frequency of the input signal (see col. 3, lines 17-48), the sampling can be applied to analog or digital input signal (see from col. 1, line 34 to col. 2, line 20), and that the sampling frequency can be fixed or varied (see from col. 1, line 34 to col. 2, line 20). From the teaching of Nyquist sampling, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the well-known Nyquist sampling into Page's system in order to increase the quality of the video signal because sampling the video signal using at least twice a highest spatial frequency will reduce noise or interference.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

TT

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